The sources of systematic error would seem to be almost wholly reduced to those of varying personal equation in the observation of transits at all speeds and at all inclinations and directions over horizontal wires, and to possible systematic difference in atmospheric refraction in different azimuths. Mr. Rockwell exhibited some results, simply copied from his observing-books, illustrating the methods of reduction for time and latitude observations, and showing the degree of accuracy that can be attained by the instrument in both these directions. They served to show that the instrument when duplicated will give equally good results with the one first constructed; and their consideration gave rise to a very interesting discussion, participated in by many members, as to the character of work the instrument might be expected to do, in the course of which Mr. Rockwell answered, in a very entertaining way, many questions, put by various members, as to the details of observing and reducing, which were not before clearly understood on account of the novelty of the work. One of the most important problems which the instrument is specially adapted to investigate, and one which we hope Mr. Chandler will soon find time to undertake, is the determination of the declination of fundamental stars south of the equator, tying them to northern stars at corresponding zenith-distances below the pole. This would seem to be by far the best, perhaps the only, method of connecting these together in a way that shall be free from systematic error.

In the Physical Section, the first paper read was by Prof. Langley, on the spectra of some sources of invisible radiations, and on the recognition of hitherto unmeasured wave-lengths. This was followed by one by Mr. Brashear on a practical method of working rock-salt surfaces for optical purposes.

Prof. H. S. Carhart presented a paper on surface transmission of electrical discharges, which was an ingenious revision of work by Prof. Henry. Prof. E. L. Nichols presented some further notes on the chemical behaviour of magnetic iron, a continuation of work described in a paper at the Philadelphia meeting. Major H. E. Alvord of Mountainville, New York, presented the results of telemetric observations at Houghton Farm. This is a method by which changes in temperature are transmitted and recorded electrically; and Major Alvord's results show that, with increasing experience, the records followed more and more satisfactorily the observations made on the mercurial thermometer.

Prof. T. C. Mendenhall called attention to the modifications and improvements already made or desired in electrometers, especially with reference to their use in observations on atmospheric electricity. Observations of this kind have been made regularly for the last year or two; but, as Prof. Mendenhall well said, the meaning of the variations recorded is still a mystery. Prof. A. E. Dolbear read three papers: in one he described a method of studying contact-theory of electricity by means of the telephone. He has found that a click is produced in the telephone every time the circuit is broken between two heterogeneous materials, as copper and zinc. In another paper he referred to his success in employing a Bernstein incandescent lamp for projection purposes; and in the third he described a new galvanic element of high electromotive force and great constancy, consisting of carbon in a saturated solution of bichromate of potash, and sulphuric acid and zinc in a saturated solution of ammonic chloride; nitric acid could be used in place of sulphuric. Mr. A. J. Rogers presented a paper on electrolysis of the salts of the alkaline earth.

Prof. E. D. Nicholls has, by means of a spectro-photometer, described at a previous meeting, compared the spectrum of the unclouded sky with that of the light reflected by magnesium carbonate, illuminated by direct sunlight.

Prof. Wead exhibited a combined spectro-photometer and ophthalmospectroscope.

In the Chemical Section Prof. Nichols delivered an address on chemistry in the service of public health. Amongst the papers are:—Prof. Noyes, on para-nitrobenzoic sulphuride; Dr. Wiley, on a method of estimating lactic and acetic acid in sour milk or *koumiss;* Mr. Young, on the thermo-chemical reaction between potassic hydrade and common alum. A general discussion took place on the question of what is the best initiatory work for students entering upon laboratory practice, and also, To what extent is a knowledge of molecular physics necessary to one who would teach theoretical chemistry?

In the Section of Mechanical Science Prof. Webb delivered an address on the second law of thermo-dynamics. Mr. Wagner presented an elaborate paper on electric light tests, giving an account of his work in testing the efficiency of two electric-light plants. Prof. Cooley explained and illustrated a method of testing indicator-springs. Prof. Thurston's paper on cylinder condensation is described as being of great scientific and practical value.

In the Section of Geology and Geography the address was by Prof. Edward Orton, and the subject, Problems in the study of coal, with a sketch of recent progress in geology. There were, in all, twenty-seven papers in this Section, none being geographical. Stratigraphy received the lion's share of attention, the most important paper on this subject being one by Prof. Henry S. Williams.

The address to the Biological Section was by Dr. Wilder, on Educational Museums of Vertebrates.

The Section opened with two papers by Prof. L. E. Sturtevant as the result of observations and experiments at the New York agricultural experiment station. The first, on the hybridisation and cross-fertilisation of plants. In the second—"Germination Studies"—the author gives, as a result of many trials with commercial seeds of our common plants, that very extended series of trials must be made with each species in order to obtain the desired accuracy in results.

An interesting paper on the biological deductions from a comparative study of the influence of cocaine and atropine on the organs of circulation, by Dr. H. G. Beyer, U.S.N., was read before the Section.

"On the Brain and Auditory Organs of a Permian Theomorph Saurian" was the title of an interesting paper by Prof. E. D. Cope. The author called special attention to the morphology of the brain, the character of the cranial walls and the auditory apparatus.

The disputed question of the bisexuality of the pond-scums (Zygnemaceæ) was discussed by Prof. C. E. Bessey, of the University of Nebraska, who concluded that these organisms do not possess true bisexuality.

"On the Process of Cross-fertilisation in *Campanula americana*" was the title of a paper presented by C. R. Barnes.

A paper on aquatic respiration in soft-shelled turtles (Aspidonectes and Amyda) was presented by Profs. Simon H. and S. Phelps Gage as a contribution to the physiology of respiration in vertebrates.

Prof. C. E. Bessey read a paper on the inflorescence of *Cuscuta glomerata.*

Prof. Gage addressed the Section (G) on Microscopy and Histology on the limitations and value of histological investigation, and Mr. Dall discoursed to the Anthropological Section on the native tribes of Alaska. The papers in this section were very numerous, many of great interest, and all naturally devoted to anthropological questions connected with the North American continent.

NOTES

THE National Sanitary Congress commenced its autumn meeting at Leicester on Tuesday, when the president, Prof. De Chaumont, F.R.S., gave an address on the work of the Sanitary Institute.

THE portrait of the late George Bentham, subscribed for by several of his friends, has been presented to the Herbarium, Royal Gardens, Kew, on behalf of the subscribers, by Sir John Lubbock. The picture is a successful reproduction, by Miss Merrick, of the original in the possession of the Linnean Society.

WE regret to notice the death of M. Breton des Champs, one of the French Government engineers, a mathematician and scientific writer who played a prominent part in connection with the Newton forgeries. In combination with his friend Leverrier, M. Breton des Champs exploded these frauds, which were so disgraceful to the good name of the French Academy of Sciences. He discovered the books from which the so-called "forger with long ears" had copied the assumed letter sold to M. Chasles.

THE Essex Field Club will hold its sixth annual cryptogamic and botanic meeting in Epping Forest on Friday and Saturday, October 2 and 3. On the Saturday afternoon and evening there will be an exhibition of fungi and other plants, fresh and preserved, with micro-objects; and papers will be read by Dr. Wharton and Mr. Worthington Smith. The following botanists, among many others, are expected to be present, and will act as "referees" in various departments of plant-lore:—Prof. Boulger, Dr. Braithwaite, Dr. M. C. Cooke, Rev. J. M. Crombie, Rev. Canon Du-Port, Messrs. J. L. English, Henry Groves, F. J. Hanbury, E. M. Holmes, David Houston, A. Vaughan Jennings, Frederick Oxley, W. W. Reeves, Worthington G. Smith, C. A. Wright, Dr. Spurrell, Dr. H. T. Wharton, &c. Those wishing to attend should communicate with the hon. secretary, Mr. W. Cole, Buckhurst Hill, Essex, who will forward programmes giving full particulars.

THE Trustees of the Gilchrist Lectures Fund have arranged for courses of six lectures in each of five Lancashire towns—Blackburn, Lancaster, Chorley, Colne, and Padiham, and for similar courses in Greenock, Paisley, Stirling, Alloa, and Kilmarnock—all to be delivered during October and December. No lectures will be given during November in consequence of the General Election in that month. The lecturers entrusted with the work are: Prof. R. S. Ball, Rev. W. H. Dallinger, Prof. W. C. Williamson, Dr. Andrew Wilson, and Mr. W. Lant Carpenter. Each course includes three lectures on biological and three on physical subjects, oxyhydrogen lantern illustrations being freely used, and in some cases experiments also. As usual the charge for admission will be one penny, and the largest available rooms are secured for the lectures, special measures being taken to insure the attendance of working men. There will probably be similar courses in five Midland towns in the spring.

WE are informed that the vacant Chair of Physics and Engineering in University College, Bristol, has been filled by the appointment to the post of Prof. John Ryan, M.A., King's College, Cambridge, D.Sc. London, and Member of the Institute of Mechanical Engineers. Dr. Ryan, who is a practical engineer, has hitherto held the appointment of Professor of Mechanics and Engineering in University College, Nottingham. At Bristol he succeeds Prof. Thompson, now Principal of the Finsbury Technical College, and Prof. Hele Shaw, recently appointed to the Professorship of Engineering in University College, Liverpool.

MR. F. C. LEHMANN, a German botanist, who has travelled or over ten years in Central and South America for the purposes of scientific researches, has arrived safely at Panama, from Europe, which he lately visited in order to arrange with other scientific colleagues to assist him in the classification of his extensive collection of objects of natural history. Mr. Lehmann was about to proceed to the Cauca, where he intends to remain for several years, with his domicile in Popayan. He proposes the continuation of former labours and minute researches into the botanico-geographical conditions of the Flora of Tropical America.

THE exceedingly unusual character of the following announcement, coming from the United States, will attract attention. We take it from *Science*:—"On account of the lack of funds necessary to maintain its activity, the Astronomical Observatory of Beloit College, Wisconsin (Prof. J. Tatlock, jun., director), has been closed."

THE experiments for the electrical illumination of the Palais Royal are very successful. The number of incandescent lights used is 150. The Théâtre Français, Théâtre du Palais Royal, and Council of State have agreed to the deed of agreement signed by the shopkeepers, so that thousands of lamps will soon be in operation. But before taking a final decision, the subscribers are trying every description of incandescent lamp.

A SERIES of science lectures has commenced at the Royal Victoria Hall, Waterloo Bridge Road, and promises to be as successful as any previous one. On September 29, W. J. Harrison, F.G.S., will lecture on "Stone Tools and the Men who used them." On October 6, Mr. A. H. Fison will lecture on "Some Other Worlds." On October 13, Prof. H. G. Seeley, F.R.S., will lecture on "Coal."

WE learn from the *London and China Telegraph* that a work on which Dr. Dudgeon of Peking has been engaged for upwards of ten years, has just been issued in eighteen Chinese volumes. It comprises a translation of Gray's "Anatomy" and Holden's "Osteology." There are in addition two volumes of plates, comprising 600 cuts, which have occupied the time of two men for two years and a half. The whole of these cuts have been made at the expense of the Chinese Foreign Office, and the work has been published in a series issued by the Foreign Language College at Peking. It is proposed to establish in connection with this college a medical school and hospital to provide proper practitioners for the service of the army, navy, and palace.

A REPORT on carp-culture in China has been made by Dr. Macgowan to the Carp-Culture Association of the United States. Pisciculture, it appears, was cultivated at a very early period, being regarded as a branch of agriculture. The carp is, of all fish, the most frequently reared by artificial means in China, but nearly every species of *Cyprinidæ*, bream, tench, roach, goldfish, &c., is so raised. A treatise on fish-rearing has been attributed to a Minister of the fifth century before our era, but it it appears to have been really written eight centuries later. The work says that of the five modes of rearing animals by far the most productive and valuable is fish-breeding. The pond used for this purpose (it goes on) should be an acre in extent (the depth is usually less than eight feet), and nine stone islets, each having eight inlets or bays, a yard below the surface of the water, should be constructed in it; then twenty gravid carp and four males, each three feet long, are to be deposited in it noiselessly in the month of March. Two months later a turtle should be placed in the pond, two months later a couple, and after a like period three more. By this time there will be 360 carp. The turtles are to prevent their being transformed into dragons and flying away. The object of the islets and bays is to afford greater space for the fish in their sinuous voyages, for the more a fish travels the fatter and bigger he becomes. The Chinese author then makes the following calculation: in the following year the pond will be found to contain 150,000 carp 1 foot in length, 450,000 3 feet, 10,000 2 feet. In the third year 100,000 1 foot, 50,000 2 feet, 50,000 3 feet, and 40,000 4 feet. A thousand of those that are 2 feet in length should be retained for replenishment, and all the rest be sent to market. In another year their number will exceed all calculation, and they require no feeding, hence the value of carp culture. All the varieties, we are told, come from the black species. Those destined to become white change to silver or yellow, while the others turn first red and then golden. Some of the white sort are so nearly transparent that their viscera are visible. Much of the art of rearing them consists in affording due amounts of shade and sunshine in the course of their growth, and in changing their water, not more than half of which is to be removed every fourth day. In the earliest times the practice, which continues to-day, was introduced of planting mulberries on the margins on which apiaries were placed, the droppings from which fed the fish, while the leaves of the trees first nourished silkworms and then goats. These droppings are said to impart a peculiar flavour to the fish.

A CONSIGNMENT of soles and brill has lately been despatched by the National Fish Culture Association to the American

Government as a slight recognition of the presentations of ova made by them to this country. There is a great dearth of flat fishes in the United States, and at the instigation of the Commissioners of Fish and Fisheries many attempts have been made to forward young specimens for propagation from England. Hitherto these efforts have not met with success, it being exceedingly difficult to transmit live soles, as they are less tenacious of life than their congeners. We hope that Prof. Baird, who has received notice of the despatch of this valuable gift, will not be again disappointed. The fish have been placed in charge of an experienced pisciculturist, who will accompany the s.s. *Republic*, by which vessel they have been sent, and who will bring back a number of American species with a view to acclimatising them in this country.

The Royal Commissioners of the Colonial Exhibition, to be held next year at South Kensington, have issued circulars to the Governors of our Colonies requesting them to send the various species of fish indigenous to their respective countries for exhibition. Special preparations will be made at the close of October for receiving them. The arrangements will necessarily be of an elaborate nature, as the tanks will have to be constructed in such a manner as to provide for the exigencies of each species and the regulation of high and low temperatures according to the climatal necessities of the fish.

Special interest is just now centred at the Aquarium in the incubation of the ova of some of the dogfish which have recently spawned. The eggs, which resemble filbert nuts in shape, are to be seen in a special tank, which presents a sight of much edification. The formation of the fish inside the ova is plainly perceptible, every part of them being apparent. The fish in the Aquarium are now being fed at 6 o'clock, partly on a new dietary specially invented by Mr. W. Burgess, of Malvern Wells.

The Marquis of Lorne has successfully planted some whitefish in a specially constructed lake on the Isle of Mull. The fish form part of those reared by the National Fish Culture Association this year. His Lordship reports that the fish are doing well.

At a lecture delivered by Mr. W. Oldham Chambers, F.L.S., at the Hull Town Hall last week on fish culture, living specimens of the whitefish and other foreign species of fish were exhibited, and excited much interest amongst the audience.

A recent *Bulletin* of the United States Fish Commission contains the following interesting account of the destruction of young trout by mosquitoes: "In the middle or latter part of June, 1882, I was prospecting on the head-waters of the Tumichie Creek, in the Gunnison Valley, Colorado. About 9 o'clock in the morning I sat down in the shade of some willows that skirted a clear but shallow place in the creek. In a quiet part of the water where their movements were readily discernible, were some fresh-hatched brook or mountain trout, and circling about over the water was a small swarm of mosquitoes. The trout were very young, still having the pellucid sack puffing out from the region of the gills, with the rest of the body almost transparent when they would swim into a portion of the water that was lighted up by direct sunshine. Every few minutes these baby trout—for what purpose I do not know, unless to get the benefit of more air—would come to the surface of the water, so that the top of the head was level with the surface of the water. When this was the case a mosquito would light down and immediately transfix the trout by inserting its proboscis, or bill, into the brain of the fish, which seemed incapable of escaping. The mosquito would hold its victim steady until it had extracted all the life juices, and when this was accomplished, and it would fly away, the dead trout would turn over on its back and float down the stream. I was so interested in this before unheard-of destruction of fish that I watched the depredations of these mosquitoes for more than half an hour, and in that time over twenty trout were sucked dry and their lifeless bodies sent floating away with the current. It was the only occasion when I was ever witness to the fact, and I have been unable by inquiry to ascertain if others have observed a similar destruction of fish. I am sure the fish were trout, as the locality was quite near the snow line, and the water was very cold, and no other fish were in the stream at that altitude. From this observation I am satisfied that great numbers of trout, and perhaps infant fish of other varieties in clear waters, must come to their death in this way; and if the fact has not been heretofore recorded it is important to those interested in fish-culture."

A telegram from Rome, September 21, states that repeated shocks of earthquake have occurred in Benevento. The inhabitants are terror-stricken, and are encamped in the open country.

The Russian *Official Messenger* states that the city of Namangan, in Ferghana, has been visited all through the summer by repeated shocks of earthquake, which have hitherto been of very rare occurrence there. The strongest shocks took place on April 17 and August 4, but no very serious consequences resulted.

On September 12, at 9.30 p.m., a magnificent meteor passed over the city of Stockholm, going from south to north. Its light was very brilliant. On account of the limited area of observation it was impossible to tell whether it burst near the city or not.

During the month of August enormous swarms of ants passed over the town of Solothurn in Switzerland. They came from the Jura mountains, and formed a cloud, consisting of seventy-five perpendicular columns, in which the ants circled around in spiral form. The swarm lasted for twenty minutes, the height of the cloud being upwards of ninety feet. Millions of them fell to the ground, however, without making any visible change in the phenomenon.

According to the *Bergen Adresseblad*, fishermen at the island of Mögster, on the coast of the province of Bergen, on the west coast of Norway, have lately seen large floating blocks of ice at sea, which are believed to be parts broken off from icebergs in the North Atlantic. Such a phenomenon has never before been observed in these parts.

The Swedish journal *Norrbottens Kuriren* states that the water is falling rapidly in the Gulf of Bothnia, a phenomenon to which we have on several occasions referred. As a further proof of this the journal states that a stone in the archipelago by the coast which fifty years ago at lowest tide was barely visible above water is now at mean tide three feet above it.

We have pleasure in noticing the issue of No. 43 of the first part and Nos. 29-31 of the second part of the well-known "Encyklopædie der Naturwissenschaften" from the house of Eduard Trewendt, Breslau. The former brings forward Dr. A. Reichenow's "Handwörterbuch der Zoologie, Anthropologie, und Ethnologie," from article "Heteronereis" to "Icteridæ." Among other articles embraced within this interval are valuable contributions on the development of the organs of hearing by Prof. Griesbach; on "Hypnotismus," by Prof. Gustav Jäger; on "Januten," "Japaner," "Javanen," by Dr. von Hellwald; on "Hissarlik," "Hohlefels," "Hohlkeit," by Prof. Mehlis. Nos. 29 and 31 of the second part, again, continue the "Handwörterbuch der Chemie," while the 30th number continues the "Handwörterbuch der Mineralogie, Geologie, und Paläontologie." The two chemical numbers treat with all the fullness and thoroughness characteristic of this estimable work "Dichte," "Didym," "Diffusion," "Dinte," "Diphenylverbindungen," "Dissociation," "Dünger," and "Eisen," and the accompanying woodcuts illustrating any difficult experiments in the text add materially to the practical value of the articles. The new number, finally, of the Mineralogical, Geological, and Palæontological Dictionary contains important contributions on "Reptilien" and "Rhizopoden," by Rolle; on "Salze," by Kenngott; on "Schichtenlehre" and "Schwankungen im Niveau vom Meer und Festlande," by von Lasaulx—articles distinguished not more by fullness and compactness of matter than by clearness of dan. ne

WITH unflagging vigour and learning the new Italian quarterly, *La Nuova Scienza*, prosecutes the mission it has undertaken of building up an exact philosophy on the foundation of the natural and historical sciences. In the last number for June, 1885, the articles of chief interest, all contributed by the indefatigable editor, Prof. Enrico Caporali, are: Modern Italian thought, German anticlerical evolution, and the Pithagoric formula in cosmical evolution. The last-mentioned paper deals with the evolution of gravitation, of heat, of electricity, chemical affinity, lower organic force, higher organic force, sentient force, social authority; fatalist and free evolution. It is held in general that all evolution is due more to internal energy than to outward conditions, in opposition to Herbert Spencer's theory of mechanical causes.

THE address of Mr. W. H. Dall, vice-president to the Anthropological Section of the American Association for the Advancement of Science at Ann Arbor, last month, has been printed as a separate pamphlet. The subject of the address was "The Native Tribes of Alaska."

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus* ♂) from India, presented by Mr. A. Cornet; a Red Kangaroo (*Macropus rufus* ♀) from Australia, presented by Mr. G. Wylie; a Bonelli's Eagle (*Nisaetus fasciatus*) from North Africa, presented by Capt. W. R. Taylor, s.s. *Empusa*; two Tawny Owls (*Syrnium aluco*), European, presented by Mr. H. Lee; a Nightjar (*Caprimulgus europæus*), European, presented by Mr. Cuthbeth Johnson; a Robben Island Snake (*Coronella phocarum*) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; seven Blue-bearded Jays (*Cyanocorax cyanopogon*) from Para, purchased; a Beisa Antelope (*Oryx beisa* ♀), born in the Gardens.

ASTRONOMICAL PHENOMENA FOR THE WEEK, 1885, SEPTEMBER 27 TO OCTOBER 3

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on Sept. 27

Sun rises, 5h. 56m.; souths, 11h. 50m. 51·3s.; sets, 17h. 46m.; decl. on meridian, 1° 48′ S.: Sidereal Time at Sunset, 18h. 13m.

Moon (three days after Full) rises, 19h. 0m.*; souths, 2h. 1m.; sets, 9h. 13m.; decl. on meridian, 10° 42′ N.

Planet	Rises	Souths	Sets	Decl. on meridian
	h. m.	h. m.	h. m.	° ′
Mercury	4 29	11 1	17 33	5 36 N.
Venus	9 34	14 12	18 50	16 17 S.
Mars	0 19	8 11	16 3	19 47 N.
Jupiter	4 33	11 1	17 29	4 46 N.
Saturn	22 1*	6 9	14 17	22 19 N.

* Indicates that the rising is that of the preceding day.

Occultations of Stars by the Moon

Sept.	Star	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image	
			h. m.	h. m.	°	°
28	48 Tauri	6	21 56	22 45	33	273
28	γ Tauri	4	23 46	0 43†	36	279
29	75 Tauri	6	4 41	5 41	149	268
29	θ^1 Tauri	4½	4 48	5 26	54	1
29	B.A.C. 1391	5	5 41	6 51	109	324
30	111 Tauri	5½	3 2	4 17	73	268
30	117 Tauri	6	5 15	6 5	53	341
Oct.						
2	λ Geminorum	3½	0 38	1 32	30	248

† Occurs on the following day.

The Occultations of Stars are such as are visible at Greenwich.

Sept.	h.	
27	9	Mercury in conjunction with and 0° 52 north of Jupiter.
Oct.		
1	11	Saturn in conjunction with and 4° 15′ north of the Moon.
3	19	Mars in conjunction with and 5° 4′ north of the Moon.

THE ASTRONOMICAL ASSOCIATION

THE Astronomical Association held their eleventh general meeting this year at Geneva from Aug. 19 to 22 inclusive, and the representatives of so many nations were present that the meeting fully bore out the character of an international one. Among the fifty members, or thereabouts, attending were: Struve, from Pulkowa; Newcomb, from Washington; Christie, from Greenwich; Dunér, from Lund; Pechule, from Copenhagen; Tietjen, from Berlin; Krüger, from Kiel; Schur, from Strassburg; Tisserand, from Paris; Spörer, from Potsdam. The office-bearers were: Auwers, from Berlin, President; Schönfeld, from Bonn, and Seeliger, from Munich, Secretaries; Bruns, from Leipzig, Treasurer: while Bakhuyzen, from Leiden, Gyldén, from Stockholm, and Weiss, from Vienna, were honorary members of the Committee. Prof. Oppolzer, who was also a member of the Committee, was unable to attend.

The first sitting was opened by President Auwers in the aula of the University at 10 in the forenoon of the 19th. Among the scientific reports of the Committee the full communications of Prof. Weiss on the present state of the computations of the orbits of the comets were of special interest. Of the 12 periodical comets returned at different times to their perihelion, 8 had again been regularly determined by the same calculators. Of the remaining four three were removed from our present care: Biela's, which, as was known, had been lost to observation, and the comets of Halley and Pons-Brooks, whose next perihelion lay too remote in the future. There was, consequently, but one periodical comet—Brorsen's—to be taken account of. As to the remaining non-returning comets, of the 168 which had appeared in this century 41 were to be regarded as settled, 23 had their orbits pretty well determined; in the case of 58 comets a new calculation of the orbit was desirable for various reasons, and in all 46 had yet to be calculated definitely. There was, therefore, a wide field of labour open. Prof. Weiss accordingly sought to commend to the Society the establishment of a common calculation bureau for the settlement of the questions at issue, while the exact detailed treatment of a particular comet should in future, as hitherto, be left to the initiative of a single calculator. In the discussion following this address, Staatsrath Struve argued against the founding of such a bureau on the ground that the comets were of too peculiar a nature to accommodate themselves to the methodic treatment of a calculation bureau. No resolution was taken on the question.

This report was followed by communications of a business character on the great zone undertaking of the Society. These communications were of no great extent, the undertaking being already in near prospect of completion. The photometric survey of the heavens by Prof. Pickering, of Harvard College, read by Prof. Auwers, was heard with special interest.

Next followed the scientific addresses. Dr. Schram, Observer